

Unit 5

Factoring

Day 1

Factoring Using Integers - Part 1

Factoring Using the GCF

$$\begin{aligned} 1) \quad & -8a^5 + 24a^3 - 44a^2 \\ & -4a^2(2a^3 - 6a + 11) \end{aligned}$$

2a)

$$5(x+3)^2 - 7(x+3)$$

$$(x+3)[5(x+3) - 7]$$

$$(x+3)(5x+15-7)$$

$$(x+3)(5x+8)$$

2b)

$$5(x+3)^2 - 15(x+3)$$

$$5(x+3)[(x+3) - 3]$$

$$5(x+3)(x)$$

$$5x(x+3)$$

FACTORING THE DIFFERENCE OF SQUARES

1) $4a^2 - 25$

$$(2a+5)(2a-5)$$

2) $16x^{2r} - y^{6s}$

$$(4x^r + y^{3s})(4x^r - y^{3s})$$

3)

$$(x+y)^2 - 25$$

$$(x+y-5)(x+y+5)$$

$$\begin{aligned} & \underbrace{\hspace{10em}} \\ & 25 - (x+y)^2 \\ & [5 - (x+y)][5 + (x+y)] \\ & (5-x-y)(5+x+y) \end{aligned}$$

4)

$$16x^8 - 1$$

$$(4x^4 - 1)(4x^4 + 1)$$

$$(2x^2 - 1)(2x^2 + 1)(4x^4 + 1)$$

FACTORIZING PERFECT SQUARE TRINOMIALS

1) $9m^2 + 30m + 25$

$(3m + 5)^2$

$3m \cdot 5$
 $15m$
 $30m$

2) $x^6 - 14x^3 + 49$

$(x^3 - 7)^2$

FACTOR BY GROUPING

1)

$$\begin{array}{l} (a^2 - ab) + (5a + 5b) \\ a(a-b) + 5(a+b) \\ (a-b)(a-5) \\ \hline (a^2 - ab) - (5a + 5b) \\ a(a-b) - 5(a+b) \\ (a-b)(a-5) \end{array}$$

2)

$$\begin{array}{l} m^2 - 4n - 4m - n^2 \\ (m^2 - n^2) + (-4n - 4m) \\ (m-n)(\underline{m+n}) + 4(\underline{n+m}) \\ (m+n)(m-n-4) \end{array}$$

ONE PROBLEM - FOUR WAYS!

1st way - factor by grouping (aka - "rainbow")

$$6x^2 + x - 15$$

$$6 \cdot 15$$

$$\frac{-90}{-9}$$

$$10 \cdot 9$$

$$10 + 9 = 19$$

$$10 \cdot 9 = 90$$

$$\begin{aligned} & (6x^2 + 10x) + (9x - 15) \\ & 2x(3x + 5) + 3(3x + 5) \\ & (3x + 5)(2x + 3) \end{aligned}$$

ONE PROBLEM - FOUR WAYS!

2nd way - box method

$$\begin{array}{r} -90 \\ 10 \overline{) -9} \end{array}$$

$$6x^2 + x - 15$$

$$3x \quad 5$$

$2x$	$6x^2$	$10x$
-3	$-9x$	-15

$$(2x-3)(3x+5)$$

ONE PROBLEM - FOUR WAYS!

3rd way - "BEST" method

$$\begin{array}{r} 6x - 15 \\ -90 \\ \hline 10x - 9 \end{array}$$

$$6x^2 + x - 15$$

$$\frac{(6x + 10)}{2} \left(\frac{6x - 9}{3} \right)$$

$$(3x + 5)(2x - 3)$$

ONE PROBLEM - FOUR WAYS!

4th way - Educated guessing

$$6x^2 + x - 15$$

A handwritten diagram for educated guessing. It consists of an oval containing the numbers 10 and -9. Above the oval, the number 90 is written with a horizontal line through it. An arrow points from the 90 towards the 10 and -9 inside the oval.

A handwritten factored form of the quadratic equation $6x^2 + x - 15$. It is written as $(3x + 5)(2x - 3)$. A curved line connects the constant terms 5 and -3, with the label $10x$ written below it. A larger curved line connects the leading coefficients 3 and 2, with the label $6x^2$ written below it.

HOMEWORK:

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